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* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to a portable telephone. It is related with the portable telephone equipped with the function to receive hour entries transmitted by the base station in more detail, such as the date and current time.
[0002]
[Description of the Prior Art] A portable telephone can be used moving without receiving constraint of the telephone line also outdoors by communicating with a base station by wireless. Therefore, the dc-battery is used for the power source. Since a portable telephone can equip the interior with a clock function and the date and time of day can be displayed on displays, such as liquid crystal, a user can always know the date and time of day. Moreover, in migration communication system, such as a cellular phone, there is a thing including the hour entry which contains current time in a part of control information transmitted to a mobile station by the base station. Since this hour entry is managed by the base station, it is fully exact.
[0003]
[The technical problem which invention will solve and to carry out] However, since the precision of the clock inside a portable telephone is not absolute, a user needs to set a clock correctly periodically. Moreover, since the portable telephone is using the dc-battery as the power source, if power resource are lost, a clock function is reset and can hold neither a right date nor time of day. Even if power resource are lost, in order to hold a clock function, the auxiliary dc-battery only for backup is required. Moreover, although the hour entry transmitted by the base station was fully exact, this was not effectively used for it.
[0004] The purpose of this invention utilizes effectively the clock information transmitted by the base station, and is always offering the portable telephone which can hold and display a right hour entry. Moreover, it is offering the portable telephone which can proofread this automatically, without being based on a help, when the portable telephone is equipped with the clock.
[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the portable telephone of this invention is equipped with a means to receive the hour entry transmitted by the base station, the clock means which holds and updates current time, and a means to proofread the current time held at said clock means based on said hour entry. Moreover, the portable telephone of this invention is equipped with a means to receive the hour entry transmitted by the base station, a means to memorize a hour entry, a 1st updating means to update the hour entry memorized by said storage means when said receiving means receives a hour entry, and a 2nd updating means to update the hour entry memorized by said storage means for every predetermined time.
[0006]
[Function] A portable telephone (mobile station) is connected with a base station (fixed station) by the radio circuit in migration communication system, such as a cellular phone. There are a control channel

and a message channel in a radio circuit. Although a control channel is mainly used for control of call origination, a call in, etc., it shall be used also in order for a base station to transmit a hour entry to a portable telephone. A message channel is mainly used for a message. The portable telephone in a standby condition receives a control channel, and judges whether the local station is called from the base station. Moreover, when a hour entry is received, displays, such as LCD, are controlled based on this. Moreover, a clock is proofread when the portable telephone is equipped with the clock.

[0007]

[Example] An example explains the dual mode mold portable telephone which can be used in the analog mode which used the analog modulation method for the message channel, and the digital mode of the TDMA method which encodes a sound signal and is transmitted as digital data. Drawing 1 shows the configuration of the dual mode mold portable telephone 1. The portable telephone 1 mainly consists of the baseband section 2 and a radio-frequency head 3.

[0008] The voice codec 4 generates the voice data digitized by carrying out analog-to-digital conversion of the analog sound signal from a microphone 5. Moreover, the digital to analog of the digitized voice data is carried out, and it is outputted to a loudspeaker 6. With a VSELP method, a voice DSP 7 compression-encodes and decrypts the digitized voice data. According to the VSELP method, the data compression of the amount of data of the digitized voice data can be made about 15%. Although the voice DSP 7 is always operating in digital mode, it does not operate in analog mode.

DSP 8

[0009] Baseband DSP 8 performs processing of control data, burst control, equivalence processing of received data, etc. in digital mode. In analog mode, processing of a compandor, pre-emphasis, de-emphasis, and an SAT signal etc. is performed. At the time of control channel reception, a message is judged from a control signal.

CODEC 9

[0010] The baseband codec 9 works as an analog to digital and a digital/analog converter between the baseband section 2 and a radio-frequency head 3. A control signal is detected at the time of control channel reception.

[0011] SRAM10 has the memory capacity about a 128K cutting tool, and memorizes the subscriber phone number data of control program and portable telephone 1 self, speed dial data, etc. 11 is a keypad for operating a portable telephone 1. 12 is LCD (Liquid Crystal Display) for displaying the operating state of a portable telephone 1, time of day, a date, etc. 13 is a LCD driver for driving LCD12, and builds in the character generator.

[0012] 14 -- RTC (Real Time Clock) it is -- while holding the date and time of day, this is always updated by the RTC itself. CPU15 controls a radio-frequency head 3 while controlling above-mentioned each part through the address data bus 16. A radio-frequency head 3 carries out the RF modulation of the signal which the baseband section 2 outputted with a pai-fourth-Differential-QPSK method, and outputs it from an antenna 17. Moreover, it restores to the high frequency signal received from the antenna 17 with a pai-fourth-Differential-QPSK method, and baseband signaling is outputted to the baseband section 2.

[0013] Next, the subscriber's-number data memorized by SRAM10 are explained. It is referred to as MIN (Mobile Identification Number), and a subscriber's number is SID (System Identification). NAM (Number Assignment Module) is constituted. MIN and SID are memorized by SRAM10 as shown in drawing 2 (a). SID is for identifying the system (service firm) which offers radiotelephony communication service.

[0014] Since SID is contained in the message (control information) of the control channel transmitted by the base station, a mobile station can judge whether subscriber registration is carried out at the system under reception by comparing SID (henceforth SIDp) of NAM with SID (henceforth SIDr) contained in the message. If subscriber registration is carried out and the portable telephone will not be to exist in home area, it will exist in roaming area.

[0015] An example of the hour entry transmitted by the base station is shown in drawing 3 . A base station shall transmit a hour entry as shown in drawing 3 to periodical or predetermined timing. a hour entry -- the time -- a part, a day, and not only a day of the week but the same system -- the data in which it is shown whether time difference arises in a service area are also included. A time has 0-23 expressed

with 5 bits, a part has 0-59 expressed with 6 bits, and a day has 1-31 expressed with 6 bits. Moreover, a day of the week has 1-7 expressed with a triplet. 0 is Sunday and 1 is Monday... 6 expresses Saturday. A time zone flag is 1 bit, and when 0 does not have time difference into a service area, 1 shows the case where there is time difference. The information which shows a second is not included in this hour entry. Therefore, although rehabilitation of the time of day in a second unit, storage, and a display are impossible, the error of 1 minutes or more does not produce a portable telephone 1. Of course, it is also possible for the data in which a second is shown to be included in a hour entry.

[0016] The proofreading function of the clock by this invention is explained. When a portable telephone 1 is in a standby condition, the portable telephone 1 has received the control channel transmitted by the base station. It is received by the antenna 17, and the high frequency signal transmitted from the base station is sent out to the baseband codec 9, after getting over to baseband signaling by the radio-frequency head 3. The baseband codec 9 detects a control signal from baseband signaling, and sends it out to baseband DSP 8. Baseband DSP 8 judges a message from a control signal, and applies interruption to CPU15.

[0017] Hereafter, processing of CPU15 is explained, referring to drawing 4 . CPU15 performs the following processing according to the program memorized by SRAM10. If baseband DSP 8 generates interruption, CPU15 will detect a message (S1). Detection of a message judges the class of message (S2). the processing corresponding to a message if a message does not show a hour entry -- performing (S3) -- (S4) which compares SID (SIDp) memorized by SID (SIDr) and SRAM10 which received from the base station when the message showed the hour entry.

[0018] The case of SIDr=SIDp is explained in S4. In this case, it is the case where a portable telephone 1 receives the service of a system (home SHITEMU) by which subscriber registration was carried out. It investigates whether the automatic proofreading function is set up (S5). A user can set up whether an automatic proofreading function is used by actuation of a keypad 11. If an automatic proofreading function commits that there is time difference in the service area of the same system etc., when becoming inconvenient, an automatic proofreading function can be canceled. If the automatic proofreading function is canceled, automatic proofreading of a clock will not be performed. If the automatic proofreading function is set up, CPU15 will update the time of day of RTC14, and a day entry by the hour entry of a message (S6).

[0019] In S7, it investigates whether time difference is in a service area. if there is time difference -- LCD12 -- the date and time of day -- a flashing display -- carrying out (S8) -- (S9) which will indicate the date and the time of day by lighting to LCD12 if there is no time difference. If the time stamp of LCD12 is blinking the user, it turns out that time difference is in a service area.

[0020] Next, the case where it is not SIDr=SIDp is explained in S4. In this case, it is the case where a portable telephone 1 receives the service of a system (roaming system) by which subscriber registration is not carried out. It investigates whether the automatic proofreading function is set up like S5 (S10). A user can set up whether an automatic proofreading function is used for every home area and roaming area. Moreover, in the case of roaming area, when the user registers specific SID (henceforth SIDu) into the portable telephone 1 beforehand, it can set up so that an automatic proofreading function may be used only in the case of specific roaming area (local assignment mode).

[0021] Automatic proofreading will not be performed if the automatic proofreading function is canceled. If the automatic proofreading function is set up, CPU15 will update the time of day of RTC14, and a day entry by the hour entry of a message (S6). Moreover, SIDr is compared with SIDu, when an automatic proofreading function is set up and SIDu is registered (local assignment mode) (S11). If SIDr differs from SIDu, automatic proofreading will not be performed, but automatic proofreading will be performed if in agreement (S6). After that, it is the same as the case of home area (S7, S8, S9).

[0022] Although MINSID memorized by the above-mentioned portable telephone 1 is 1 set, there is also a portable telephone which can memorize two or more sets (for example, 3 sets) of MIN(s) and SID so that subscriber registration can be performed in two or more areas. In this case, as shown in drawing 2 (b), 3 sets of NAM(s), NAM1, NAM2, and NAM3, are memorized by SRAM10. A user may choose freely and it can also be automatically chosen by the comparison with SIDr any of two or more NAM(s)

are used. When two or more NAM(s) are memorizable, it is also possible to enable it to set up and cancel the automatic proofreading function of a clock for every NAM.

[0023] Thus, since RTC14 can be proofread whenever it receives a hour entry from a base station, a user does not have to do time-of-day adjustment and does not need the backup battery of dedication for RTC14. Moreover, a user embraces an operating condition, and can set up and cancel an automatic rehabilitation function according to a factor independent [the existence of the time difference in a home system / roaming system, and a service area, a specific roaming system, NAM to be used], or multiple.

[0024] Although the above-mentioned example described the portable telephone which is equipped with RTC14 and proofreads RTC14 automatically by the hour entry from a base station next, the portable telephone which is not equipped with RTC is described. Although the portable telephone 21 shown in drawing 5 is the point equipped with a timer 18 for 1 minute and is different from the portable telephone 1 of drawing 1 instead of RTC, the other configurations of it are the same as that of a portable telephone 1. The 1-minute timer 18 has the function to send an interruput signal to CPU15 for every minute. Moreover, it has the field which memorizes current time of day and a date to SRAM10.

[0025] CPU15 performs processing shown in drawing 6 (a) according to the program memorized by SRAM10. If baseband DSP 8 generates interruption, CPU15 will detect a message (S21). Detection of a message judges the class of message (S22). the processing corresponding to a message if a message does not show a hour entry -- performing (S23) -- the time of day and the date which were memorized by SRAM10 when the message showed the hour entry -- a hour entry -- updating (overwrite) -- carrying out (S24) -- it displays on LCD12 (S25).

[0026] Moreover, a timer 18 sends an interruput signal to CPU15 for every minute for 1 minute. CPU15 which received the interruput signal from a timer 18 for 1 minute performs the interrupt handler shown in drawing 6 (b). that is, the time of day and the date which were memorized by SRAM10 -- updating (S (clock being set forward for 1 minute) 26) -- the time of day and the date which were updated are displayed on LCD12 (S27). The time of day memorized by SRAM10 is applicable to the appointed time-of-day alarm function (a user sounds an alarm at the time of day specified beforehand), or an automatic powering-off function (a user disconnects a power source at the time of day specified beforehand).

[0027] In a portable telephone 21, since not only the backup battery of RTC but the RTC itself becomes unnecessary, components mark are reducible. Moreover, the time of day of the area can always be displayed irrespective of home area and roaming area.

[0028]

[Effect of the Invention] In the portable telephone of this invention, since proofreading of the date and time of day, storage, a display, etc. are performed based on the clock information transmitted from a base station, a user does not need to proofread a clock and does not need to have a backup battery only for clocks. Cost reduction is convenient also not only for becoming possible but a user.

[Translation done.]

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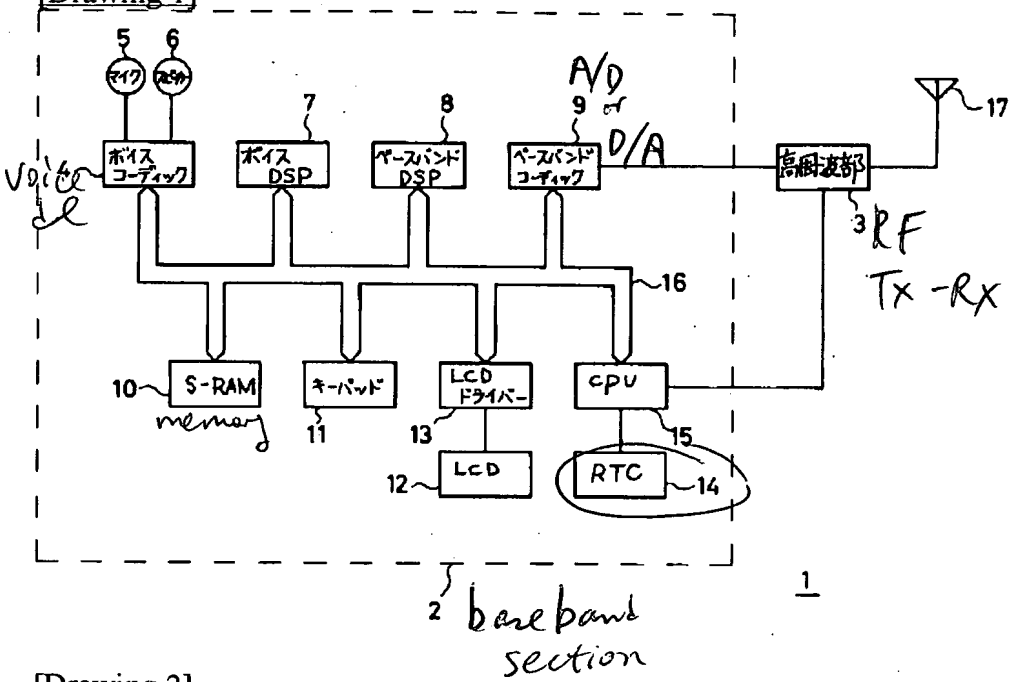
DRAWINGS

[Drawing 1]



[Drawing 2]

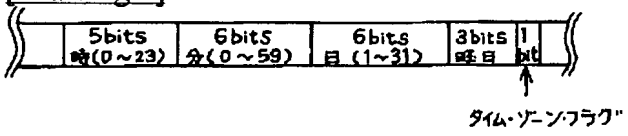
(a)

アドレス	データ
1	NAM — SID
2	NAM — MIN

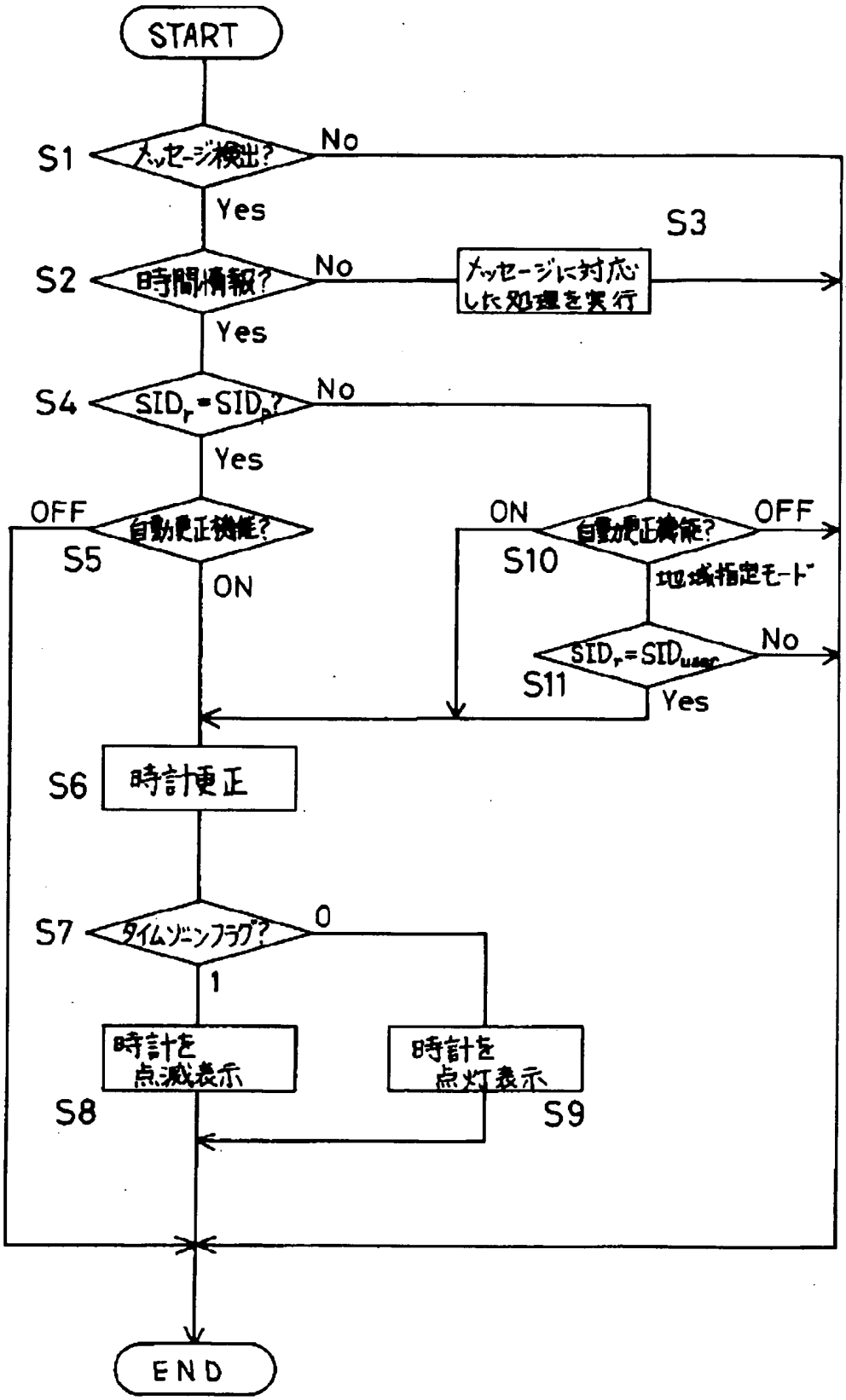
(b)

アドレス	データ
1	NAM1 — SID
2	NAM1 — MIN
3	NAM2 — SID
4	NAM2 — MIN
5	NAM3 — SID
6	NAM3 — MIN

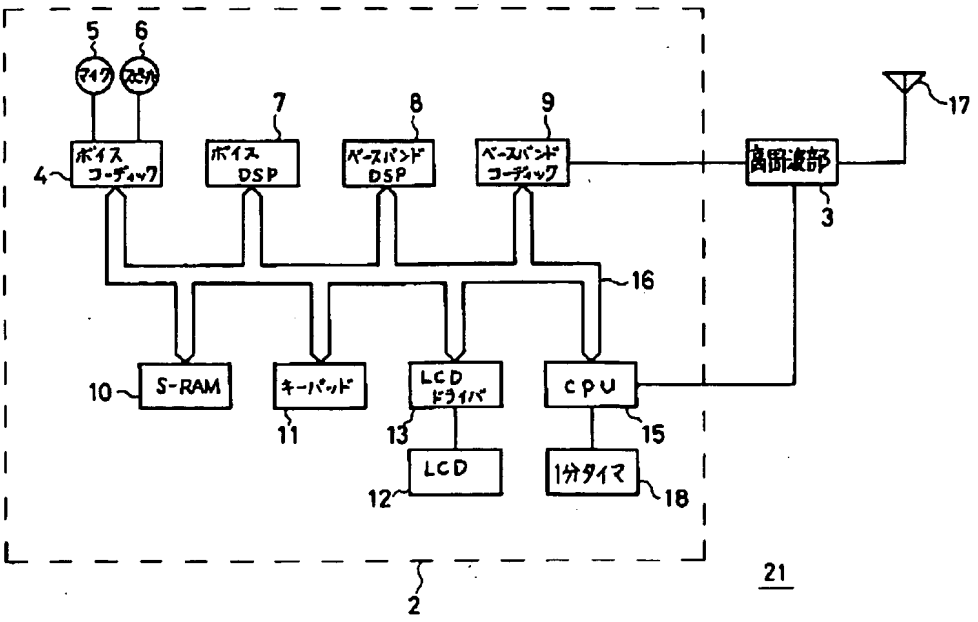
[Drawing 3]



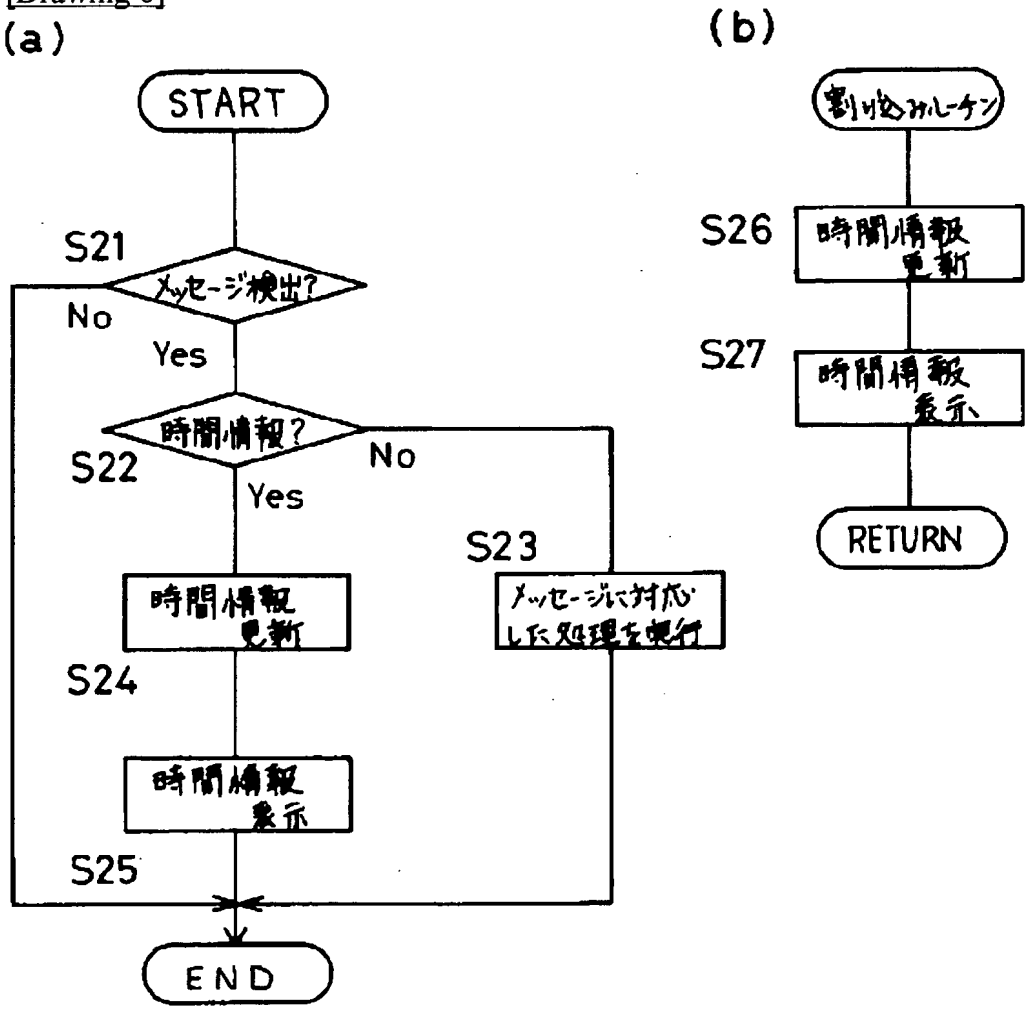
[Drawing 4]


START
S1
メッセージ検出?
No
Yes
S2
時間情報?
No
S3
メッセージに対応した処理を実行
Yes
S4
SIDr=SIDp?
No
Yes
OFF
自動更正機能?
S5
ON
ON
自動更正機能?
OFF
S10
地域指定モード
SIDr=SIDuser
No
S11
Yes
S6
時計更正
S7
タイムゾーンフラグ?
0
1
時計を点滅表示
S8
時計を点灯表示
S9
END

[Drawing 5]


5
6
マイク
スピーカ
4
ボイス コーディック
7
ボイス DSP
8
ベースバンド DSP
9
ベースバンド コーディック
無線通信部
17
3
16
10
S-RAM
キーパッド
11
LCD ドライバ
13
LCD
12
CPU
15
1分タイマ
18
2
21

[Drawing 6]


(a)
START
S21
メッセージ検出?
No
Yes
時間情報?
S22
No
Yes
S23
時間情報 更新
メッセージに対応した処理を実行
S24
時間情報 表示
S25
END
(b)
割り込みルーチン
S26
時間情報 更新
S27
時間情報 表示
RETURN

[Translation done.]